CCS-Toolkit-Full

SUPPORTED BY

GLOBAL CCS INSTITUTE

The Scottish Government
Riaghaltas na h-Alba

Scottish Carbon Capture & Storage

Carbon Capture and Storage Regulatory Test Toolkit

Are you ready for your first Carbon Capture and Storage project application?

www.globalccsinstitute.com

Executive Summary

Large point sources of carbon dioxide are responsible for a significant proportion of the world's greenhouse gas emissions – with fossil fuel power stations and other large-scale industrial activities responsible for around half of the total. Carbon Capture and Storage (CCS) is expected to make a major contribution to reducing these emissions.

Few CCS projects currently exist in the world – and a lack of experience in regulatory agencies and commercial entities of how regulatory systems would apply to such projects increases risk – potentially leading to delays and increased costs for emerging CCS projects.

This toolkit has been produced by Scottish Carbon Capture and Storage (SCCS) researchers on behalf of the Scottish Government and sponsored by the Global CCS Institute. It guides users through a regulatory test exercise, which provides a low-cost, low-risk approach to testing regional and national legislation and regulatory systems for CCS projects, and gaining the benefits in follow-up activities.

The toolkit recommends use of a real or simulated CCS project as part of this exercise to assist government agencies and other stakeholders to work together to test and improve understanding of regulatory systems. It explains how a simulated or real CCS project can be taken through the regulatory process from inception to decommissioning – a test of the regulatory process at much lower cost, time and risk than would be incurred under a real project application.

Implementing this toolkit will assist users to:

- improve understanding of their local regulatory process
    - the permits and consents necessary for a CCS project
    - the information required
    - the likely timescales for planning and approval
    - the organisations that need to be involved
- identify gaps, contradictions, and potential revisions to regulatory systems
- identify gaps in skills, knowledge and resources
- ensure a viable regulatory process is in place for potential CCS projects
- help to speed up the management of projects to meet demanding timescales for funding
- raise awareness amongst the key stakeholders of their role in the regulatory process

The test exercise seeks to be realistic and to maximise learning opportunities, by involving the actual organisations and people that would be involved in effective handling of a CCS project. The exercise should be led by a government body with the intensive involvement of relevant regulatory agencies. Other stakeholders to involve will include commercial organisations, NGOs, and advisory bodies in the context of regional, national, or cross-jurisdictional project planning.

By working together towards a common vision, and ensuring strong participation and input by key stakeholders, this toolkit will assist users to run a successful regulatory test exercise, identify follow-up actions, and gain the benefits sought.

This exercise will inform government policy and developing CCS regulatory frameworks. Additionally, it should reduce the regulatory risk to CCS project developers – accelerating the consenting process and reducing the burden to all participants involved in that process – as well as ensuring an appropriate balance with other policy objectives.

Acknowledgements

This toolkit was researched and written by Benjamin Evar and Hannah Chalmers from the University of Edinburgh's SCCS research group, and Richard Bellingham from the University of Strathclyde.

The research and writing team would like to thank the following individuals (key organisers, workshop facilitators and reviewers for a Scottish CCS regulatory test exercise in 2010, see Appendix F) for their contributions, including in interviews:

- Professor Russel Griggs, Scottish Government Regulatory Review Group;
- Meade Harris, Global CCS Institute;
- Eric Drosin, EU Zero Emissions Platform;
- Carolyn Vannan, Scottish Environment Protection Agency;
- Ross Loveridge, Scottish Government;
- Howard Steele, Scottish Government;
- Derek Saward, UK Department of Energy and Climate Change; and
- John Arnott, UK Department of Energy and Climate Change.

Additionally, a substantial amount of background documentation and feedback from the Scottish 2010 CCS regulatory workshop event was made available by the Scottish Government.

The authors gratefully acknowledge comments received on earlier versions of this document from a number of expert reviewers. They are, however, entirely responsible for its content.

In no event will the Scottish Carbon Capture and Storage, the Global CCS Institute or the Scottish Government be liable for any consequences or unintended implications resulting from the use of this toolkit.

Contacts

Bob Pegler, Global CCS Institute: bob.pegler@globalccsinstitute.com

Colin Imrie, Scottish Government: colin.imrie@scotland.gsi.gov.uk

Table of Contents

Appendices

List of figures

List of boxes

1. Introduction

CCS is a process used to capture, transport, and store carbon dioxide (CO_2) emissions from power plants and high emitting industrial installations in geological structures. The individual steps in this chain are often proven technologies in their own right that have been used for decades. However, their combination into a single technology system and the implementation of commercial scale projects presents a new challenge to existing regulatory frameworks.

Aims of this toolkit

This toolkit is designed to support regional and national governments seeking to establish whether their regulatory framework and systems are fit for purpose. It provides a guide to testing regulatory systems by taking a CCS project application through every stage of the approval process in a regulatory test exercise.

This test exercise should significantly reduce cost, time and risks for considering CCS project applications by improving understanding of regulatory frameworks and processes for CCS. A number of factors can be considered when testing whether packages of regulations are fit for purpose including:

- establishing if a framework is comprehensive, covering all relevant aspects;
- checking for gaps and overlaps in the regulatory process;
- ensuring that the roles of regulators are clearly defined;
- determining if regulations can be applied efficiently and effectively, and represent regulatory best practice; and
- assessing whether the framework minimises the administrative, time and cost burden for Government, industry and regulators while providing community confidence.

It is expected the test exercise will be run by a government body with significant input from relevant regulatory agencies. Additionally, a targeted selection of stakeholders in industry, academia, and beyond are likely to be involved in the CCS regulatory test exercise. This toolkit can also be used by these stakeholders to improve their understanding of the exercise and how they can participate effectively.

Toolkit structure

The rest of this section provides an overview of the complete CCS regulatory test exercise. The document then explains the key activities needed to complete a successful test. These are:

- careful planning and preparation (section 2);
- developing key tools to support planning and running the event (section 3);
- running a CCS test workshop and in particular gathering the views of delegates (section 4); and
- ensuring effective follow-up to gain maximum benefit from the event (section 5).

Objectives and benefits

The main objective of conducting a CCS regulatory test exercise is to examine existing regulations related to the full carbon capture, transportation, and storage chain – throughout the life of the project from inception to decommissioning – and to clarify how these affect project development.

The benefits of a rigorous analysis include:

- improved understanding of the regulatory process for all stakeholders – including clarity on:
  - the permits and consents necessary for a CCS project to proceed
  - the information required
  - the likely timescales for planning and approval
  - the organisations that need to be involved
- understanding of the expertise necessary to both submit and assess a CCS project for approval
- testing the robustness of the existing regulatory framework
- clarity on possible procedural gaps and overlaps
- formation of a community of interest around CCS regulation
- development of a documented regulatory workflow process across government departments and agencies

Audience

This test exercise seeks to be as realistic as possible, and to maximise learning opportunities, by involving the organisations and people that are integral to the complex processing of a real CCS project. These include commercial organisations, government departments, regulatory agencies, NGOs, and possibly members of the local public. The involvement of several different types of participants allows each to understand their role in the regulatory chain, and to identify gaps in knowledge or expertise, with direct feedback from other stakeholders.

Box 1 : Timing and resources for a CCS regulatory test exercise

Three major stages have been identified as central when conducting a CCS regulatory test:

Preparation

A significant stage of planning and preparation, outreach to a wider CCS stakeholder community, and analysis of existing regulatory structures. Designed to ensure the existing regulatory process is understood; that government, regulators, and business are committed to the test exercise; and a suitable CCS project is selected or created as a test case.

Workshop Event

Test the regulatory system using the selected CCS project; identify scope for improvement in the existing process – including gaps in legislation and knowledge. Capture recommendations for action.

Gaining the benefits

Capturing and summarising lessons learned from the entire exercise, particularly in workshop feedback, and utilising this information to plan follow-up actions; and engaging with the organisations necessary to make recommendations reality and report the key findings to a broader audience.

It is suggested that around 3 months is allocated for the preparation process to ensure that government departments and agencies, regulators, private developers, NGOs, and other relevant stakeholders can be brought in to comment and contribute to the exercise in a timely fashion. This will require that a project team works full time to prepare the workshop event, and that knowledge flows freely between government departments, regulatory agencies, and industry partners. A full checklist for a CCS regulatory test exercise, including indicative timings, can be found in Appendix A.

2. Planning and preparation

This section explains the planning and preparation for the CCS test exercise. Allowing sufficient time for this phase of activity is essential to the success of the exercise and any follow-up actions.

As illustrated in Figure 1, the main activities are divided into four strands:

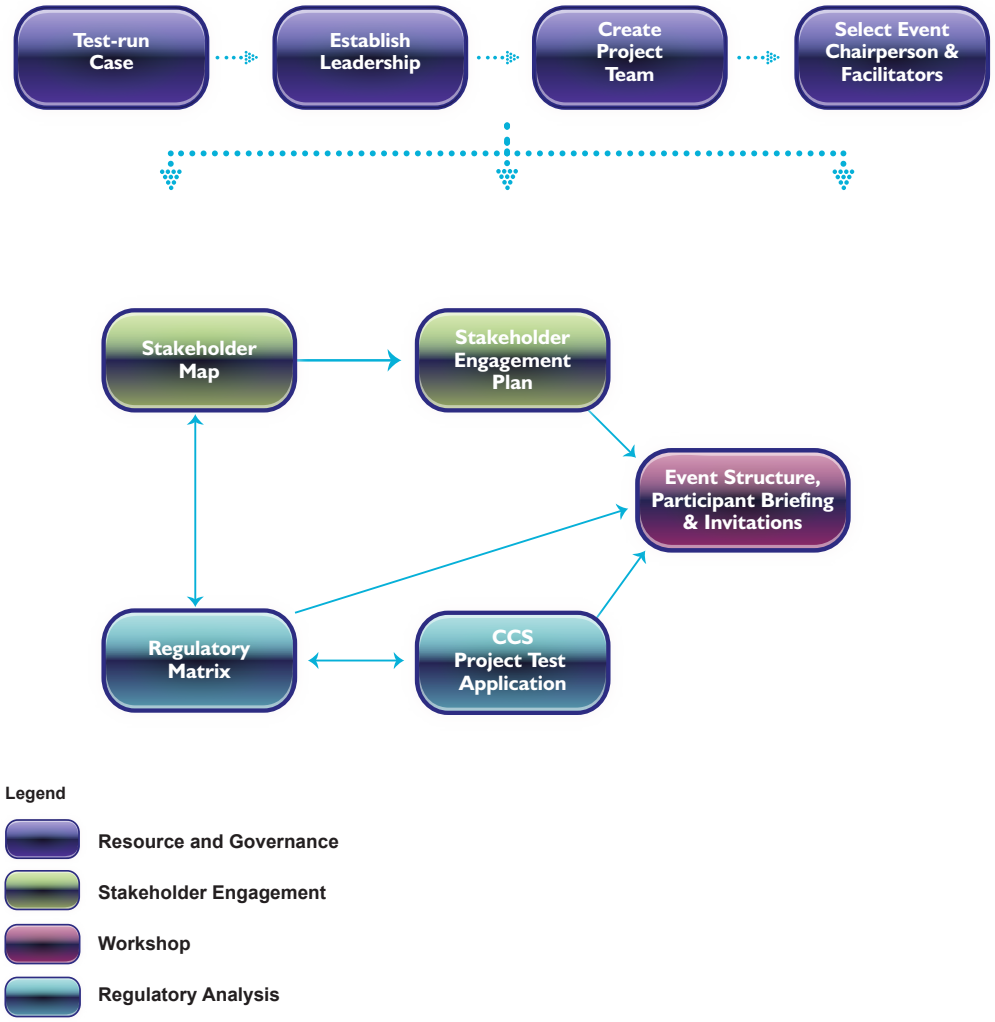
- Resources and governance
- Stakeholder engagement
- Regulatory analysis
- Preparation for the event

2.1 Resources and governance

Identifying a lead organisation

The CCS regulatory test exercise will require an organisation to lead the exercise. The lead organisation should be a government department or regulatory agency. This body will have a significant stake in the successful completion of the exercise; be perceived as neutral by different commercial players; and will offer knowledge of existing structures in the electricity sector, oil and gas extraction, and environmental regulation.

Figure : 1 Planning and preparation flowchart



Test exercise initiation

In many organisations it may be necessary for the lead organisation planning the exercise to develop a business case early on that establishes the key objectives, expected outcomes, resources required, and high level timescales of the test exercise. Depending on internal management systems and the level of resources required, the business case may require formal approval in order to gain the necessary resources – including the creation of a project team and budget to run the workshop. Other organisations may be able to initiate the exercise using a less formal approach. The approach to initiation and resource approval will vary between countries.

Setting objectives - developing a vision

The objectives of the exercise will need to be developed and clarified with other relevant stakeholders within government and elsewhere, who possess different knowledge and beliefs about CCS and the benefits of regulatory inquiry. The primary starting objective should be to test whether the existing and emerging regulatory framework is fit-for-purpose for the effective processing of future CCS projects.

Another objective should be to create or develop a community of interest around CCS within government. A regulatory test exercise might also be used to gauge the level of support for CCS in a wider stakeholder community. These objectives and any others should be clarified early on in order to ensure that the exercise delivers on the expectations of stakeholders, as well as allowing adequate time for the preparation of briefing materials and other tools used in future stages of the exercise.

Establishing leadership

Different approaches can be used to manage the test exercise. The lead organisation may choose to run the whole exercise itself – this is likely to be a quicker and clearer management process and may suit regulatory environments where almost all of the relevant powers are held by a single entity. In environments where powers are spread across multiple entities there may be advantages to involving other key stakeholders in the planning of the exercise by establishing a steering group. This can help engage the support and resources of these stakeholders and ensure that their viewpoints are taken on board in the design of the exercise. However, creating and running a steering group is likely to be a slower and more onerous process than a single organisation taking full responsibility for running the exercise.

If a steering group is established, then its remit should be to manage the exercise up to, during, and beyond the workshop event by reaching out to the relevant stakeholders, supporting the data gathering on regulations and permits, assisting in preparing tools for the workshop, and gaining decision-maker support within government departments.

The steering group may be comprised of people from across different government departments and agencies, for example a business promotion or innovation unit and the environment agency – as well as representatives from relevant commercial organisations. While the steering group will have less of a direct management role than the project team, it may help ensure that several critical issues are addressed in early roundtable meetings and lend greater credibility to the exercise. To cement this credibility, members may be drawn from industry associations and governments that have previously conducted a CCS regulatory test exercise.

If a steering group is not created the lead organisation should consider alternative methods for engaging with and involving key stakeholders. For example, there may be existing bodies (e.g. government advisory committees) that could fulfil many of the roles of a steering group.

Creation of a project team

A small team will be necessary to take the exercise forward. Team members may be drawn entirely from the lead organisation or from more than one organisation, e.g. several government departments and regulatory agencies. A project leader should be identified to organise stakeholder engagement, development of tools, and data collection within the demanding time frame.

Setting a realistic timeline

A realistic timeline needs to be developed for the test exercise. A number of government departments, regulatory agencies and commercial organisations will be consulted and involved along the way. It is therefore suggested that around three months are allocated to prepare for the workshop event, which is an integral step in the test exercise.

An unduly short preparation time may lead to key information being missed during the data collection period, or scenarios used to steer group thinking may be less detailed than desired. Other circumstances may require the project team to spend more time preparing for the event. These include the type of government, the complexity of the regulatory system, established communication channels between relevant stakeholders and whether full-time resources are allocated for the preparation stage.

During preparation, tools to be used during the workshop (including those discussed in detail in section 3) should be developed with input from industry stakeholders who may want real project considerations highlighted, or commercially sensitive information to be edited out.

Selecting a suitable venue

A venue should be selected for the workshop event several months in advance. Some critical considerations include:

- sufficient space for multiple small group discussions, as well as a good, larger space for plenary discussions;
- ability to provide appropriate audio-visual equipment;
- accessibility to transport links and visitor accommodation (even if a single day workshop is held, it is likely that some participants will stay overnight);
- space for networking during breaks to build trust between stakeholders; and
- availability of good catering facilities, including ability to respond to special dietary requirements.

2.2 Stakeholder engagement

Mapping the stakeholders

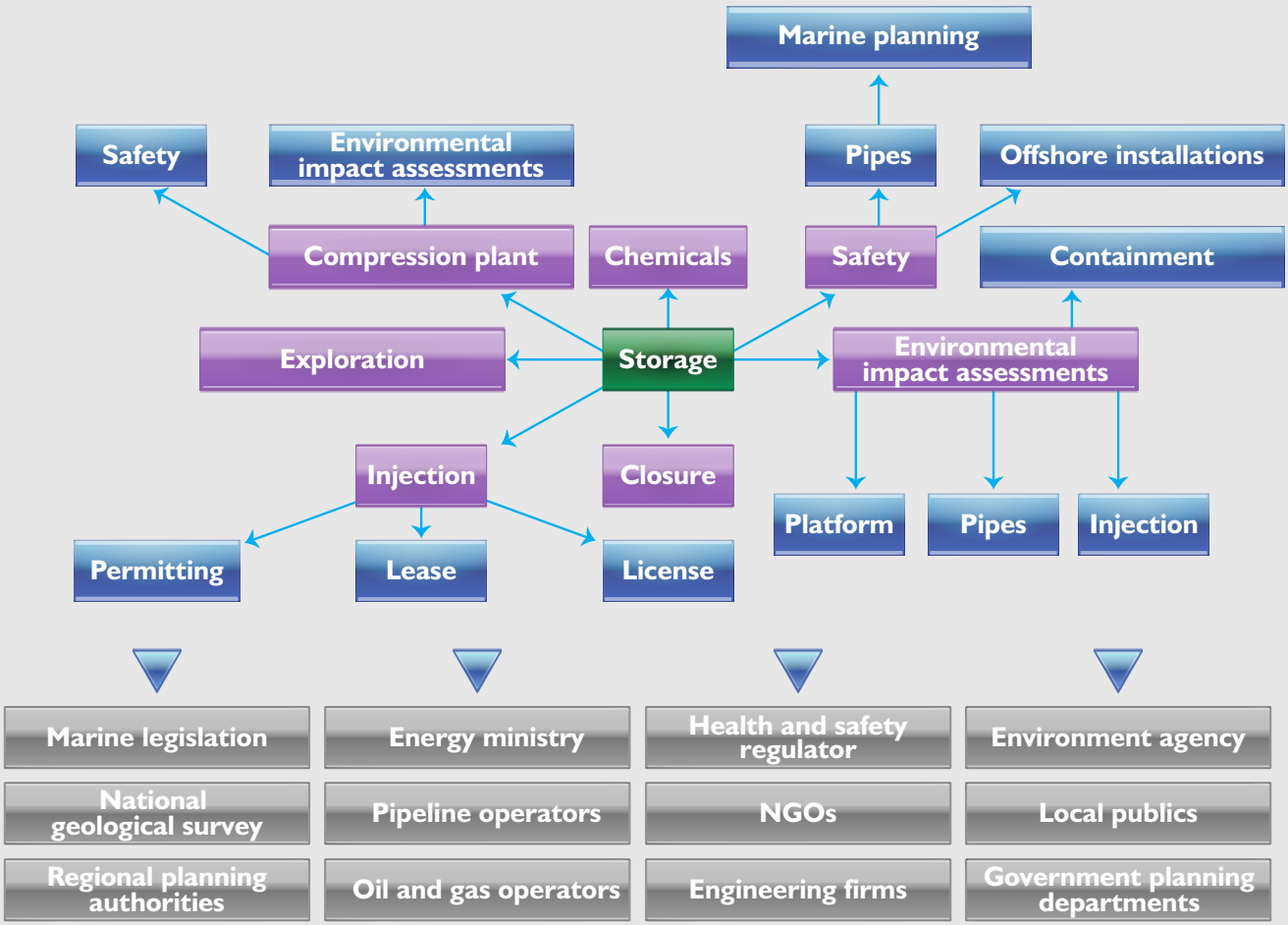
A wide range of organisations have legitimate interests in CCS and the regulatory processes that will approve and control future projects. These include:

- government departments, planners and regulatory agencies;
- several industrial sectors, for example electricity generation, oil and gas etc;
- NGOs involved with good governance and the environment;
- technical advisors and consultants; and
- academics within the CCS and governance fields.

These organisations should be identified along with their different interests and depicted in a stakeholder map. Based on the stakeholder map the project team should develop a stakeholder engagement plan for approval by the steering group, if a steering group has been formed. Box 2 includes more detail on how such a map can be developed and used in practice.

Box 2 : Developing a CCS stakeholder map

Figure : 2 Illustrative stakeholder map for CO_2 storage



An early activity for the project team should be to map all of the CCS stakeholders in government and beyond, as illustrated in Figure 2. Stakeholder maps can be used to identify the main roles and interests that different organisations and groups have in relation to a CCS project. Each organisation or group may have many roles or interests and the stakeholder map can be refined to identify and prioritise each of these. This process will clarify the relative importance of different organisations at different areas of the CCS chain. It should be noted that a number of other considerations should be highlighted as part of this exercise, including legal aspects.

The map should be updated regularly as more groups are identified, their particular interest and area of expertise is understood and changing perspectives on priorities arise. The map will thereby serve as a contact sheet, an illustration of CCS project application areas, and an early tool to identify time and resource constraints.

See Appendix B for an example stakeholder map.

Determining the scope and length of the workshop event

One use of the stakeholder map is to identify potentially different objectives of conducting the CCS regulatory test exercise. It is recommended that early discussions consider a broad range of objectives, while the appropriateness of a narrower scope is also reviewed. The final decision needs to balance several factors including the time available for preparation. In particular, it is necessary to decide whether anything beyond testing the effectiveness of the regulatory framework should be investigated over the course of the exercise. This decision will also determine which types of stakeholders should be invited to the workshop and how many days the event should last.

The intended length of the exercise should be considered alongside its scope. A workshop with many stakeholders lasting more than a day may cover more areas in depth, but makes it difficult to retain focus on key topics and to act rapidly on lessons learned. It is likely that a single day exercise with fewer participants will help retain focus more naturally. This would lead to a more manageable set of lessons, and a shorter time horizon for implementing lessons before demonstration projects are to begin. Balancing the need to ensure that the workshop event does not become too large, while ensuring a thorough treatment of critical issues is an important point that requires careful consideration. A single day workshop is therefore recommended for most jurisdictions as a way to maintain focus and to ensure that all participants will attend each of the sessions.

Establishing the event structure

A meeting of key stakeholders may be organised as part of the planning process. This should include several government, planning and regulatory groups after they have been mapped and the majority of application and permit processes have been identified.

The main aim of this meeting is to build on early attempts to determine the objectives of the exercise and to develop in more detail the exact topics to be discussed during the workshop event. It should also aim to identify the variety of objectives raised by stakeholders and to ensure that a wider stakeholder community (including developers who may possess critical technical details) are comfortable with the evolving agenda. At this stage the structure of the workshop - and crucially whether it will cover one or more days - should also be decided. (See Box 6 in section 4 for an example workshop agenda.)

Having decided on a detailed structure, the stakeholder meeting participants should also contribute to identifying which work remains to be completed in order that all participants are appropriately prepared for the event. This will in part include the preparation of presentations, and the distribution of tools and briefing materials some weeks in advance of the event (discussed in more detail in section 3).

2.3 Regulatory analysis

Data collection

Collection of data should start at the earliest point possible. Information will need to be collected from government departments and agencies, as well as the regulators, so that the full set of permit applications to be submitted for a CCS project can be identified and detailed. Early data collection and contacts with the wider CCS community will form the basis for the creation of a comprehensive list of relevant CCS regulations and permits as well as a CCS project application. These two tools will be useful in identifying relevant presentation material for the workshop as well as structuring the discussion around key issues (see section 3 for further detail on these tools).

The tools described in section 3 may be seen as freestanding documents to inform regulators and other stakeholders on the full set of regulations and permit applications that are involved in the development of a complete CCS project from scoping to decommissioning. At the same time, these tools can support CCS projects after the workshop, by updating them with the results from any ongoing data collection after the workshop event.

Refining the objectives and scope of the workshop event

Early development of these tools will also help to refine the objectives of the exercise and to decide what it should not cover. To begin with, existing regulatory provisions which affect CCS readiness and effectiveness will need to be identified. These may range from planning permissions for CO_2 capture technology, health and safety of pipeline construction, maritime legislation around geological storage of wastes, as well as the re-use of oil and gas infrastructure (see Appendix C for further suggestions).

As a detailed picture of the regulatory framework is developed, it should be possible to identify any gaps in existing and planned legislation. Opportunities for streamlining the regulatory process by avoiding overlaps may also emerge. It will also be necessary to determine which aspects of the regulatory framework will be the primary focus of the workshop event.

Creation of the stakeholder map discussed above will help to identify the full range of permits and stakeholders to be considered at this stage. Regular contact with stakeholders during the months up to and beyond the workshop event presents an easy method for populating the full list of permit applications as well as identifying gaps in regulatory procedures. This also ensures that a community of interest is maintained around CCS for follow-up activities after the workshop, any future workshop projects, as well as any CCS project applications that may be received.

2.4 Preparation for the workshop

Identifying key people for the workshop event

The workshop event chairperson and facilitators should be identified as early as possible in the planning and preparation process. This allows them to be fully involved in planning the workshop event, e.g. meeting with other key stakeholders early on to develop the format and length of the workshop (see section 2.2).

The chairperson does not necessarily need to possess a detailed understanding of CCS science and technology, but should rather be familiar with regulatory frameworks in the specific country context. Their expertise should be recognised as stemming from unbiased interest, extensive experience with applied regulation, and trust from across the stakeholder community. Independent government advisors on reform or good governance, as well as academics with experience in the formation of technology regulation, are therefore prime candidates.

Facilitators will help structure workshop discussion sessions and must therefore be familiar with the CCS technology chain as well as the regulatory framework. They must also be seen as being trustworthy and unbiased, and have good communication skills. Facilitators will ideally have been involved with planning the exercise (e.g. as part of a steering group) and therefore be familiar with the tools used to structure the workshop. Local academics familiar with CCS, as well as officials from other regional or national governments that have conducted a CCS test exercise in their jurisdiction, are likely to be good candidates.

Selecting suitable observers

Observers should be chosen from organisations that have not been integral to the planning and preparation of the test exercise, and can therefore provide objective assessments of the workshop's effectiveness. They will provide an independent 'peer review' of the exercise, helping to increase its robustness and credibility. Potential candidates include staff of international non-governmental organisations with CCS expertise and officials from other regional or national governments that have conducted a CCS test exercise.

Roles for workshop participants

The preparatory work of the chairperson and facilitators is highlighted above. During the event the chairperson will continue to function in their capacity as a neutral liaison and now also organise starting and ending discussions. Other key participants should be assigned to administrative roles before the event to help structure the discussion. Roles should be based on a participant's actual involvement in CCS, such that developers represent their own concerns etc. It is therefore important that participants are fully briefed well in advance of the workshop event.

Such roles include:

- facilitators - tasked with chairing discussions and keeping participants on time;
- observers - tasked with recording key issues, assessing the event and recommending improvements;
- competent authorities - tasked with leading the discussion on specific regulations and to ensure that the regulation can be signed off as completed;
- developers - tasked with presenting the CCS project application and also issues dealt with by the types of regulations;
- NGOs - tasked with presenting the views of e.g. the lay public and environmental protection groups;
- the local public - tasked with presenting their views in a local site under consideration; and
- technical advisors - tasked with presenting specific technical options and constraints.

Briefing participants

Participants should be briefed on the workshop agenda some days in advance and also assigned appropriate roles. To cement these roles, participants should be provided with briefings on what is expected from each of them (see Appendix D). As already noted, all stakeholders should also be provided with the same key tools some weeks in advance of the workshop event. These may include the list of relevant CCS regulations and permits, the project application, and visual data on the proposed plant development and surrounding area.

Summary of key points

- Develop a clear common objective from the start, but allow refinement in early meetings.
- Establish project team and consider establishing a steering group to guide the workshop planning process.
- Detail regulations, timing, and regulators in a stakeholder map and list of permits.
- Ensure that government bodies are driving the exercise forward.

3. Key tools

This section details the creation of the regulatory table and the CCS project application, and their role in facilitating learning and discussion before, during and after the workshop event.

3.1 Regulatory table

A key element in developing early thinking for a CCS regulatory test exercise is the listing of all relevant pieces of legislation and permit applications in a regulatory table, as illustrated in Figure 3. This ranges from permissions for small scale exploratory studies of a possible geological formation for CO_2 storage, to the decommissioning of plant and platform infrastructure.

Figure : 3 Example CCS regulatory table entries

Place in CCS Chain	Permit Type	Title	Area Covered	Granting Authority	Timing	Work needed to complete submission	Guidance from Published Material	Comments on Emerging Legislation
Capture	Approver	Plant Planning Permission	Power and Capture Plants	Energy Ministry	12 months	Site Layouts, case for new Plant, Risk Assessment etc	web links added in here	No New Legislation
Transport	Environmental	Consent for Pipeline Works	New Pipelines	Planning Ministries Local Government	12 months	Consultation with Environmental Agency and Local Public, Environmental Impact Assessment	web links added in here	New Legislation expected from...
Storage	Approver	Offshore Petroleum Activities	Survey	Energy Ministry	3 months	Survey Data, Risk Assessment, etc	web links added in here	No New Legislation
Decommissioning	Approver	Energy Act	Handover of Facilities	Energy Ministry	9 months	Financial Security Plan in place, etc	web links added in here	New Legislation expected from...

Structure

The regulatory table should be organised according to permit planning stage and may include the following information:

- type of permit - environmental, health and safety etc;
- place in the CCS chain/project lifecycle - capture, transport, storage, decommissioning;
- permit title;
- area covered by the permit;
- granting authority;
- timing from application to permit;
- details on submission requirements; and
- comments on emerging legislation.

Appendix C provides a list of permit types and may serve as a useful starting point for collecting this data. In jurisdictions where there are significant gaps in the existing and planned regulatory framework, documents such as the International Energy Agency Model Regulatory Framework (see Box 3) could be used as a starting point for discussion as part of a CCS regulatory test exercise.

Box 3 : IEA CCS Model Regulatory Framework

In November 2010, the International Energy Agency (IEA) released its most recent report on CCS legal and regulatory issues: the Carbon Capture and Storage Model Regulatory Framework (Model Framework). The Model Framework seeks to advance the deployment of CCS by supporting CCS regulatory framework development, an area identified as requiring urgent action in the 2009 IEA Technology Roadmap: Carbon Capture and Storage. Appropriate legal and regulatory frameworks are required to provide commercial certainty, ensure the effective stewardship of CO_2 storage sites and protect public health, safety and the environment.

The Model Framework draws on CCS regulatory frameworks already in place in Europe, Australia, the United States and elsewhere to provide a practical tool for governments to help develop their own national regulatory frameworks. The Model Framework harnesses the work of early-mover CCS regions by synthesising these existing frameworks to propose key principles for addressing 29 key issues identified as being critical to the regulation of CCS activities.

For each of the 29 key issues, the Model Framework provides a comprehensive overview of considerations to be taken into account when designing relevant regulatory approaches, as well as examples of how the issue has been addressed in existing CCS regulatory frameworks globally. Model regulatory text, or basic legislative-style wording, is also included for the more novel and complex CO_2 storage-related issues.

The Model Framework complements this toolkit, by assisting governments in designing appropriate regulatory frameworks for CCS, which can subsequently be tested and streamlined through the use of the toolkit.

For further information on the IEA's Model Framework, see www.iea.org/ccs/legal/index.asp.

Data collection

Identifying the full range of permits can be a time consuming process and should therefore be initiated as the very first step during data collection, which should start as soon as the project team is in place. Because CCS is a new technology which has not previously been applied on a large scale, it is possible that this process will take far longer than anticipated as more agencies are drawn in to the data collection process. Delays may also arise because of the significant number of government agencies that will have to be consulted (depending on the country/region context) most of which are involved in a range of hydrocarbon or environmental issues besides CCS.

Updating, refining and distributing the table before the workshop event

The regulatory table may be circulated to a wide set of stakeholders in government and elsewhere who can help to populate it with new data. It is therefore very much envisioned as a living document to be continually updated and refined as new information arises and a wider number of permits and consents are identified.

The final document to be used during the workshop event will likely identify tens of areas in the CCS chain where permit applications are required. To verify the authenticity of this document, a formal review should commence some weeks in advance of the workshop event. No less than two weeks before the workshop the table should be circulated to participants to ensure that everyone is familiar with the permitting requirements. The document will thereby structure presentations during workshop sessions and act as a starting point for discussions.

Continued updating and use of the table after the workshop event

If the regulatory table is developed together with a wide set of government stakeholders, private developers, NGOs, and independent experts, a more comprehensive range of permits will likely result. Extensive input during the workshop may identify ways of regulating the CCS chain better than the table of existing regulations. Networking after discussions can serve to unite a community of interest around these alternative modes of regulation and serve as a platform for future discussions around regulatory approval.

In fact, the table will likely function as a very important resource for all stakeholders going forward by eliminating uncertainties and clarifying where others exist. For example, industry stakeholders may find that this tool will significantly reduce the time and resource required to conduct independent preparatory work for prospective demonstration projects. NGOs may also find it useful to clarify the legality of proposed projects.

Box 4 : Developing a CCS regulatory table

At the beginning of a test exercise, the lead organisation should consider organising early meetings between key stakeholders including regulators involved in the electricity sector, oil and gas extraction, and environmental regulation. This group may form the core of a steering group to include industry partners and members of NGOs involved with CCS. The main objective of this first phase of work will be to consider the existing regulatory framework for CCS and to decide what level of inquiry is necessary to grasp the full extent of the permitting process.

Because of the complexity involved with the CCS system, regulators and government departments should be tasked with listing all of the permits they believe will impact the project application chain. This inquiry will form the basis of a regulatory table which will be developed in more detail up to (and after) the workshop event.

The table will function as an evolving document inviting regulators to consider their remit in relation to CCS, and to report back to the lead organisation on areas where guidance is both clear and lacking. The lead organisation should take a precautionary approach by noting any permitting gaps and require the competent authority to verify these details as soon as possible.

3.2 The CCS project application

In order to help workshop participants respond to the issues which would arise with the construction of a power station (or other large industrial source of CO_2) that aims to use CCS technology, extensive project application material should be developed. The material may either draw on real projects or simulated material as similar as possible to that used in actual projects. This will clarify the permit applications for the CCS chain and show those who are unfamiliar with power plant applications the full set of regulations that are normally considered, in addition to those regulations specifically related to CCS. Box 5 discusses some of the factors that should be considered in determining whether it is most appropriate to use a real or simulated application in your location.

Scope

The project application should first detail the power plant (or other large industrial facility) construction plan and all associated environmental impact assessments. The next step is to cover the CCS chain in detail. A section should be devoted to each of the capture, transportation, and storage of CO_2. Depending on whether onshore or offshore storage is expected, and also the treatment of pipeline construction under national jurisdictions, it may be favourable to subdivide the transportation section into onshore and offshore pipeline construction. The environmental, social, and economic impact assessments of each of these sections should be as detailed as possible and will require data collection over an extended period of time. It is also important to consider the whole project lifecycle from initial scoping to decommissioning (and potentially beyond, depending on monitoring requirements for stored CO_2). The process to develop the CCS project application should therefore start at least two months before the workshop, when initial data from the list of relevant CCS regulations and permits is available.

Role before and during the workshop

A detailed application will serve a vital role before and during the workshop. In the weeks leading up to the event, the application can show key organisers within government how a number of permits and consents will fit together in a project application. During the workshop, this application can serve as a centre piece to steer discussions. As with the regulatory table, it should therefore be distributed to participants some weeks in advance of the event, to help them prepare specific questions and comments.

Identifying sites and collecting data

The CCS project application may draw on a number of possible construction sites, capture options, modes of transportation, and intended storage locations. Each of these options should be identified early on in the planning and preparation stage of the CCS regulatory test exercise based on expertise from the relevant government departments, regulatory agencies, private developers, and academics with useful expertise. If developers are concerned about the use of proprietary information from real project considerations, suitable selections can be made based on this full range of options. The technical information necessary to construct an application may be held within several different bodies and it is therefore recommended that a main contact within the project team is selected to track responses to requests for information, and collate data as it is received.

Structure

The final application should strive to be as detailed as possible, and as a minimum a section should be devoted to each of the following elements:

- application for power station construction;
- environmental, social, and economic assessments for the whole chain - capture, transportation, and storage;
- applications for well drilling;
- applications for injection and storage consents;
- applications for CO_2 capture chemicals consents;
- maps of the sites considered; and
- applications for decommissioning.

A more comprehensive list of considerations to be raised in the application can be found in Appendix C.

Sensitivity to project developer concerns

As already noted, the full list of issues to be included in the CCS project application may prompt concern on the part of developers around proprietary data. Additionally, the power plant site selection may present a particularly sensitive topic because of possible local opposition (even if a generic site is being used as an illustrative example). Any such issues should be dealt with at the earliest stage possible in the development of the application by agreeing with industry which level of detail is acceptable.

Box 5 : Development of a CCS project application - real or simulated

The CCS project application is a vital tool to develop for the workshop session. A full application will illustrate exactly which type of evidence will be required for each permit, and the relationship between different pieces of legislation. Preliminary work on the list of relevant CCS regulations and permits and the stakeholder map will therefore support development of the project application.

Key considerations when developing the application may include:

- the location of onshore pipes;
- whether to construct an offshore pipeline and/or use tankers to transport the CO_2;
- using existing wells and/or drill new ones; and
- whether storage should take place in an aquifer or a depleted hydrocarbon field.

Appendix C includes a comprehensive list of considerations for the project application. Project selections will be based on a range of technical information available to regulators and government departments, as well as private developers. A government department will therefore find it difficult to develop the project in isolation.

A crucial decision is whether to develop a simulated project application or an application based on existing developer submissions (and/or expected future submissions). Use of a real project may increase participant interest and flag wider stakeholders' concerns before a project enters the planning stage. However in some circumstances it could open the exercise to concerns of bias, and incur opposition from the sponsors of rival projects. On the other hand a simulated project may require substantial resource for the tool to be developed, but can be designed to bring to light more complex issues which could occur in future projects.

The choice between using a real and simulated project application will likely depend on the political, commercial and planning context of the country/region in question. Government and regulatory agencies should be consulted on the appropriateness of using a real or simulated project. The project team should also consult with private developers in the steering group to determine the level of concern around the release of proprietary information and other sensitive issues associated with a real application before making its decision.

The final project application should be circulated to participants along with the regulatory table two weeks before the workshop event, to ensure that everyone is familiar with the existing regulatory requirements and options.

Summary of key points

- Use the development of a regulatory table to map the various permissions involved, and form a community of interest in CCS.
- Design a CCS project application with developers to focus workshop discussion.
- Circulate tools in advance of the workshop to prepare participants.

4. Running the workshop

Following the extended period of preparation and planning outlined in earlier sections of this toolkit, the exercise should seek to identify and synthesise knowledge and understanding from a broad range of stakeholders in a one day workshop. An example workshop agenda is outlined in Box 6. The agenda should allow participants adequate time and space for informal networking. This will assist with the development of a community of interest, through a cross fertilisation of ideas and a broader analysis of different points of view.

Box 6 : Example workshop agenda

8.30 - 9.00	**Arrivals and registration** *Registration, including tea/coffee and possibly breakfast*
9.00 - 9.30	**Overview of the day** *Welcome/Chairperson introduction, outline of objectives and rules of engagement* *Project team key tool overview*
9.30 - 11.00	**CO_2 capture** *Outline presentations to introduce key activities and distribute feedback forms* *Group discussion (limit total in each group to 15-20 people)* *Summary of key points from discussion and time to complete feedback forms* *Submit feedback forms*
11.00 - 11.30	**BREAK**
11.30 - 13.00	**CO_2 transport (same format as CO_2 capture session)**
13.00 - 14.00	**LUNCH**
14.00 - 15.30	**CO_2 storage (same format as CO_2 capture session)**
15.30 - 16.00	**BREAK**
16.00 - 17.30	**Cross-cutting issues (same format as CO_2 capture session)** *e.g. environment and health & safety, and harmonisation of regulatory schedules*
17.30 - 18.00	**Closing remarks and wrap-up**
18.00 onwards	**Networking Reception / Dinner**

Retaining workshop structure

Discussions should be structured along lines set out by the chairperson's briefing at the start of the workshop, as well as presentations by participants who possess key technical knowledge through the sessions. Within each session the tools will also help to focus discussion on the stages of development (exploratory studies, consultation, construction, decommissioning) and/or types of concerns (regulatory clarity, health and safety, environment, etc). Without a clear structure available to all participants at the start of the event, discussion may centre on concerns that are not directly related to the fit of the regulatory framework. Some flexibility will, however, be required. For example, the CCS project application will necessarily focus on a particular example of CCS deployment. Some workshop attendees will, however, wish to discuss the ability of the regulatory framework to be applied effectively to other examples (e.g. CO_2 capture for power plants and other industrial sites).

Collecting feedback

At the end of each session, participants should complete feedback forms to populate a comprehensive summation document for the entire event. Feedback sheets may be tailored to each type of participant and should explore insights gained from the workshop event as a whole, as well as capturing detailed information from each of the break-out sessions (see Box 7).

It is vital that such feedback is collected to obtain additional information and insights from workshop participants that may not have emerged during the workshop discussion. Additionally, comments that could improve future regulatory exercises, other government-sponsored CCS workshops, and possibly the design of real CCS projects might be received. Another form of feedback can be collected in a short wrap-up session at the end of the day (or possibly each session), where discussions can be centred around the processes in each workshop.

Comments and lessons learned on the application process for the entire CCS chain should form the basis of a document that can be used by government departments and agencies in charge of CCS planning to identify and implement follow-up actions. Comments on the workshop organisation and structure should also be collected and used to inform plans for future work to be conducted in the CCS field, whether or not these are specifically related to the regulatory framework.

Box 7 : Collecting feedback

Appendix E provides an example feedback form. The knowledge collected and understanding gained by analysing feedback forms and notes taken by observers during the event may take a wide variety of forms including the following:

- regulatory gaps and contradictions;
- application process collisions;
- ambiguities in authority;
- risks;
- time horizons for regulatory approvals;
- data requirements for consents;
- the type and role of any future workshops;
- strategies for management of complex consents and applications; and
- reoccurring themes from workshops such as public consultation and engagement.

Summary of key points

- Conduct workshops consecutively preferably over a single day.
- Facilitators to keep discussion focused on the effectiveness of the regulatory framework.
- Brief participants on their roles to focus discussion.
- Record and use feedback forms to increase the insight gained and gauge the success of the event.
- Include external observers to establish a more credible review of the event.

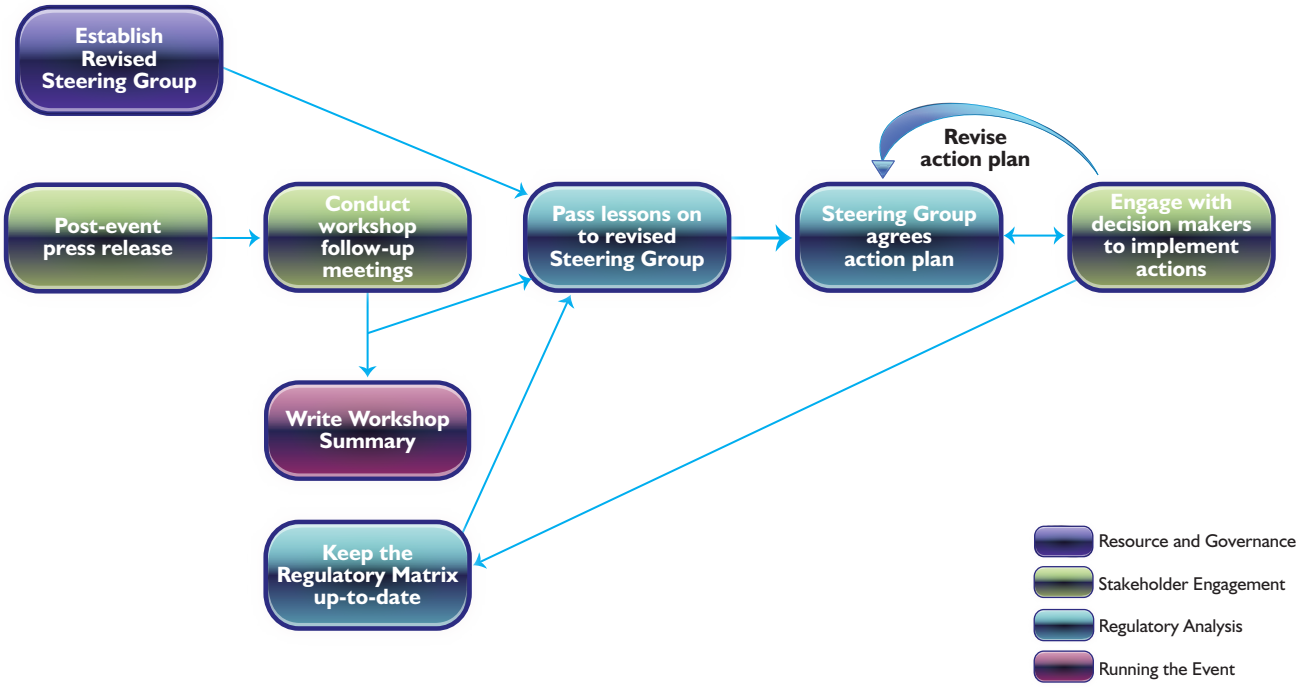
5. Following up: gaining the benefits

Following up on lessons learned after the workshop is vital if the test exercise is to deliver its intended objectives and benefits. This phase of activity is illustrated in Figure 4. Key actions are likely to be arranged in two groups:

- disseminating the results of the exercise to a wider stakeholder audience; and
- planning and engaging to deliver the agreed actions.

Delivery of the benefits needs to be overseen by a continuing steering group composed of the key stakeholders.

Figure 4 : Planning and implementing follow-up activities



Communicating with the broader stakeholder community

In addition to ensuring that workshop participants receive feedback on how lessons learned in the workshop will be used, it is important to have a robust communication strategy with a wider audience. This ensures that interested individuals and organisations who were not present (e.g. members of a local community or regulators in other countries/regions) learn about the workshop outcomes. A broad range of options could be considered as part of an effective strategy including press releases, briefing notes, or short briefing events with particular groups.

Converting workshop results into action

A key role of the workshop event will be to identify actions that should be taken forward to ensure timely processing of real applications for CCS projects. These are likely to fall into two broad categories:

- generic improvements in regulatory framework design and implementation (e.g. potential to streamline permits); and
- specific actions for any projects that are already making planning applications (e.g. establishing a project monitoring board).

A steering group should, therefore, be retained (or established) to oversee workshop reporting and any follow-up activities, including updates from CCS projects which have started the permit application process. Many of the organisations likely to be involved in the workshop planning should be involved in this follow-up steering group as well.

Resources and timescales for gaining the benefits

Resources and timescales required to act on the workshop outcomes and to amend the application processes for real projects should be considered in the light of external time constraints, such as funding application deadlines. In many jurisdictions it is likely that resource limitations will mean that it will not be possible to address all of the actions arising from the workshop simultaneously. In these cases, it is important to identify a few critical issues that are most important and focus on doing a good job in these areas in order to impact the application process for upcoming CCS projects.

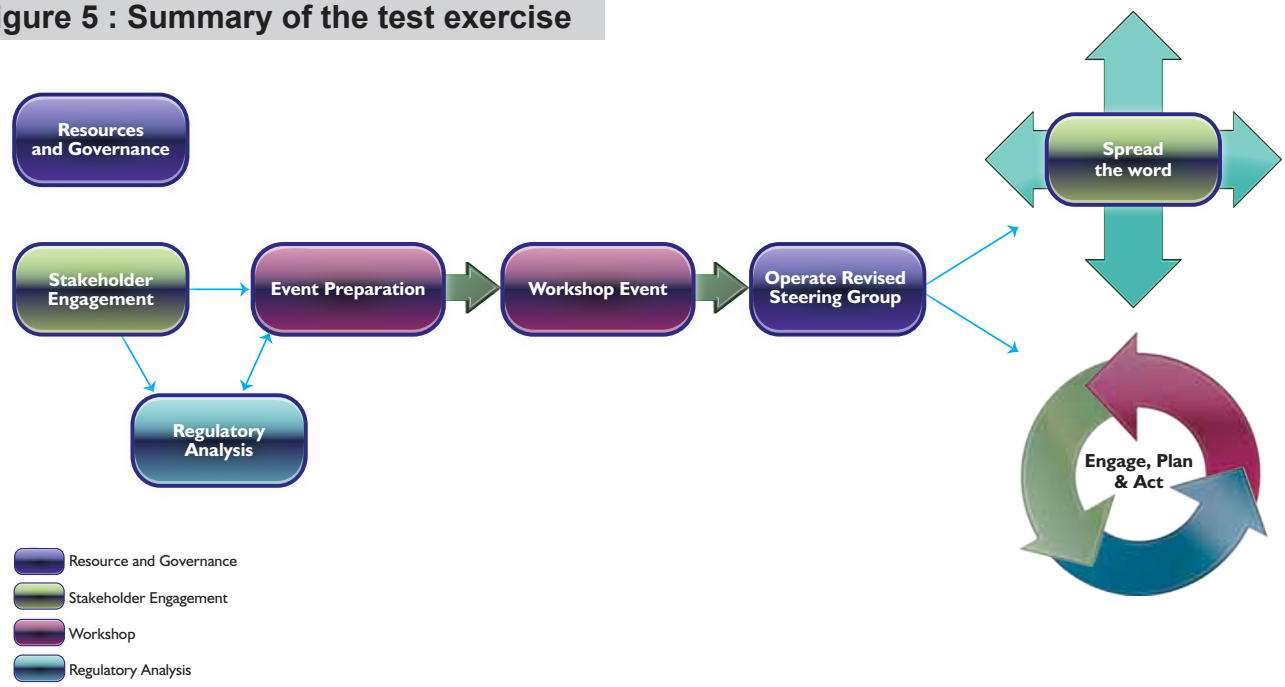
In most jurisdictions it is likely that continued maintenance of the list of relevant CCS regulations and permits in a regulatory table as an ongoing resource will be a worthwhile activity. For example, the table may serve as a focal point for stakeholder meetings around the progress of real CCS project applications in the months following the workshop. It is also likely to be a useful tool in dialogue between government, industry and other stakeholders.

Summary of key points

- Ensure the lead organisation keeps tools up-to-date and implements key lessons / actions.
- Plan an appropriate series of activities to ensure that key messages and outcomes are shared widely and effectively.
- Consider planning future events around recurring topics from workshops.
- Feed lessons from the workshop into the relevant government departments.

6. Summary of key recommendations

Figure 5 : Summary of the test exercise



Planning and preparation

- Develop a clear common objective from the start, but allow refinement in early meetings.
- Establish project team and consider establishing a steering group to guide the workshop planning process.
- Detail regulations, timing, and regulators in a stakeholder map and list of permits.
- Ensure that government bodies are driving the exercise forward.

Key tools

- Use the development of a regulatory table to form a map of the various permissions involved and community of interest in CCS.
- Design a CCS project application with developers to focus workshop discussion.
- Circulate tools in advance of the workshop to prepare participants.

Running the workshop

- Conduct workshops consecutively preferably over a single day.
- Facilitators to keep discussion focused on the effectiveness of the regulatory framework.
- Brief participants on their roles to focus discussion.
- Use feedback forms to increase the insights gained and gauge the success of the event.
- Include external observers to establish a more credible review of the event.

Following up: gaining the benefits

- Ensure that the lead organisation keeps tools up-to-date and implements key lessons.
- Plan an appropriate series of activities to ensure that key messages and outcomes are shared widely and effectively.
- Consider planning future events around recurring topics from workshops.
- Feed lessons from the workshop into the relevant government departments.

Appendix A - test exercise checklist

The following checklist should help hosts in the planning and preparation of a CCS test exercise. While all preparatory work may be completed in around three months, the following circumstances may lead to longer a time horizon:

- part-time human resource allocations;
- whether a regional or national regulatory landscape is being analysed (and complexity of links between regional and national regulations);
- lack of industry willingness to share proprietary data; and
- lack of cooperation between government departments and agencies.

Activity	Responsibility	Suggested time	Main outcome	Previous activity needed
Create case to proceed	Lead organisation	Start 3 months before the workshop	Agreement to proceed with regulatory test process	Understanding of national CCS context
Initiate regular contact government stakeholders	Lead organisation	Start 3 months before the workshop	Several work streams	
Initial investigation of existing CCS regulations	Lead organisation and regulators	Start 3 months before the workshop	Regulatory table	Informal contact with government departments and regulators
Map CCS stakeholders	Lead organisation	3 months before workshop	CCS Stakeholder Map	Early version of Regulatory Matrix
Create steering group	Lead organisation	3 months before workshop	Steering group	Consultation with key stakeholders
Create project team	Lead organisation / steering group	3 months before workshop	Project team	Consultation with steering group members
Decide on scope of the workshop	Lead organisation / steering group	2 - 3 months before workshop	Early Workshop Agenda	Early version of regulatory table
Circulation of early regulatory table for wider input	Project team	2 months before workshop	Regulatory table	Early version of regulatory table
Decision on use of real or simulated project	Lead organisation / steering group	2 months before workshop	Selected project	Consultation with key stakeholders
Begin simulated application development or capture information from real project	Project team (in consultation with Lead organisation, regulators, and private developers)	2 months before workshop	Project application for use in workshop	Early version of regulatory table
Cross check regulatory table	Project team	2 months before workshop	Regulatory table	Working version of regulatory table
Agree objectives and vision	Lead organisation / steering group	1 - 2 months before workshop	List of objectives for workshop	Earl scoping exercise, draft participant list and working version of regulatory table
Select Chairperson	Lead organisation / steering group	1 - 2 months before workshop	Workshop chairperson	CCS Stakeholder map
Agree detailed event structure	Lead organisation / steering group, project team and chairperson	1 - 2 months before workshop	Agreed detailed event structure	Agreed objectives and vision
Invite stakeholders to participate in workshop	Lead organisation / steering group	1 - 2 months before workshop	Draft participant list	CCS Stakeholder map
Venue selection	Lead organisation / steering group	1 - 2 months before workshop	Venue	Draft participant list

Activity	Responsibility	Suggested time	Main outcome	Previous activity needed
Prepare presentations for workshop discussions	Lead organisation, regulators, and private developers	2 weeks - 1 month before the workshop	List of presentations and final agenda	Agreed detailed event structure
Circulate tools for use in the workshop	Project team	2 weeks - 1 month before the workshop	Participants prepare for discussion	Tools and participant list finalised
Assign workshop roles and circulate briefs	Lead organisation, steering group, Chairperson, and project team	2 weeks - 1 month before the workshop	Participants familiarise themselves with their roles	Tools and participant list finalised
Circulate workshop agenda	Project team	2 weeks - 1 month before the workshop	Participants familiarise themselves with discussion structure	Tools and participant list finalised
Finalised plan for gathering feedback information	Project team	1 - 2 weeks before the workshop	Feedback forms written and observers to take notes identified	Workshop agenda
Run Workshop (including collecting feedback)				
Communicate with wider Stakeholder community about lessons learned and decisions reached at the workshop	Lead organisation / steering group	1 - 2 weeks following the workshop	Inform interested individuals and organisations, may galvanise wider CCS community	Workshop feedback collected
Revise steering group	Lead organisation and steering group	1 month following the workshop	Revised steering group	Workshop feedback collected
Write workshop summary and circulate to government departments	Project team / Lead organisation	1 - 2 months following the workshop	Inform Government Departments about lessons learned and appropriate actions	Workshop feedback collected
Draft Action Plan	Project team	1 - 2 months following the workshop	Action Plan	Workshop feedback collected
Agree Action Plan	Lead Organisation / steering group	1 - 2 months following the workshop	Agreed Action Plan	Draft Action Plan
Meet decision makers, achieve action	Lead Organisation / steering group	1 - 6 months following the workshop	Improvements to regulatory process etc	Agreed Action Plan
Revise Regulatory table	Lead Organisation / steering group	1 - 6 months following workshop	Updated regulatory table	Workshop summary, agreed action plan, meetings with decision makers

Appendix B – example stakeholder map

Stakeholder	Strategic Direction	Regulatory/ Planning /Legislative Role	Potential Developer	Potential Funder	Provision of Expertise/ Information	Promotion of Carbon Reduction	Need to meet Regulatory Requirements	Economic Development Job Creation	Commercial Opportunity	Concern at potential disruption due to infrastructure development	Safety/ Environmental concerns	Promotion of research and new technology
National Government	•	•		•	•	•	•	•		•	•	
Local Government	•	•		•	•	•		•		•	•	•
Regulator		•			•	•				•	•	
Environmental Agency		•			•	•					•	
Power Company			•	•	•		•		•	•	•	•
Oil Company			•	•	•		•		•	•	•	•
Bank / Investment Company				•	•				•		•	
University					•						•	•
Economic Development Agency	•			•	•			•		•	•	•
Transnational Policy Body	•	•		•	•	•		•			•	•
Citizens / Communities								•		•	•	
NGOs					•	•					•	

Appendix C - guidelines for developing CCS regulatory test exercise tools

The following types of permit applications were identified in the regulatory table used in the Scottish Government's CCS regulatory test exercise, and may be useful as a starting point for the mapping of relevant CCS regulations in other country contexts:

Power and CO_2 capture plants

- national electricity act
- electricity grid connection agreement
- national petroleum act
- national gas act
- national planning acts
- regional planning acts

CO_2 transport (onshore and offshore)

- offshore petroleum pipelines regulations
- pipeline environmental impact assessment regulations
- pipeline safety regulations

CO_2 storage (offshore)

- offshore petroleum activities regulations
- pipeline construction regulations
- offshore chemicals regulations
- United Nations law of the sea

Environmental and health and safety

- controlled wastes regulations
- pollution prevention regulations
- major hazards regulations
- offshore installation safety regulations
- coastal protection act
- conservation of natural habitats regulations
- European Directives related to the natural environment
- European regulations related to natural habitats and species
- water environment regulations
- marine environment access regulations
- greenhouse gas trading scheme regulations
- food and environment protection act

In jurisdictions where a simulated CCS project is developed, the material generated should follow the standard format used in the jurisdiction where the regulatory test exercise is happening as closely as possible. Sections that are likely to be required in most jurisdictions include:

- application for power station construction
- application for exploratory studies for CO_2 storage
- environmental, social, and economic assessments for the whole chain - capture, transportation, and storage
- applications for well drilling
- applications for injection and storage consents
- applications for pollution prevention permits (especially for CO_2 capture)
- applications for navigational consents
- approval of monitoring methodologies
- approval of an emergency plan
- interaction with enhanced hydrocarbon recovery
- conversion of hydrocarbon activities in the area proposed for the CO_2 store
- evaluation of existing pipelines
- evaluation of tanker transport suitability (in situations involving offshore storage)
- evaluation of existing wells at the storage site
- conditions for well abandonment
- decommissioning of the storage site infrastructure

Appendix D – example briefing notes for facilitators and competent authorities

The following briefs are examples of how facilitators and competent authorities could be briefed on their responsibilities during workshop sessions. They may easily be adapted to fit the contexts of capture, transport, or storage.

Facilitator briefing

Purpose – the purpose of this workshop is to assess the regulatory framework for the carbon capture technology at the power station (or transport links/storage site), to work through concerns around regulatory clarity, risks in planning, as well as time constraints around permit consents, and to agree a way forward for implementing the lessons in future project applications.

Regulations to cover – regulations will be grouped and covered in four main sections during this workshop

a. Planning
b. Environment
c. Health and safety
d. Jurisdictional and authoritative clarity

Your role – you role is to Chair the discussion and to ensure that participants remember that the objective of the session is to assess the regulatory process, identify gaps, duplications, uncertainties, risks and ways to streamline or improve each of the permitting processes. It is not to assess the actual project application. You will introduce the discussions between the lead competent authorities, other regulators, developers, NGOs, and members of the public. You need to ensure that presenters keep time and that participants do not dwell on details and lose sight of the many areas to cover during the session. You should hand out feedbak sheets at the beginning of the session for collection at the end and take notes during, preferably on a board visible to all participants. Remind participants that the exercise is being observed and that their feedback is critical to ensuring a successful outcome. At the end of each of the sessions, you will Chair a summary discussion in which participants reflect on the exercise and the lessons learned.

Lead competent authority briefing

Briefing largely as above, with section on role substituted with the following:

Your role – your role is to lead the discussion on the regulations for which you are the lead competent authority, to ensure that a decision is reached on the permitting process, to account for any areas where regulations are inappropriate or inadequate, and if possible to sign off on individual regulatory processes. This discussion should involve the other competent authorities, developers, NGOs, and members of the public. Where another competent authority is in the lead on a particular piece of regulation, the Chair will ask them to lead that particular part of the discussion.

Observer briefing

Briefing largely as above, with section on role substituted with the following:

Your role – your role is to observe the overall process and note down key findings as you go along, using the observer record sheet and the various boxes. You need to make an overall assessment of the discussion, what worked well in the assumed regulatory process, and note specific lessons for future CCS projects. This information will be invaluable in helping shape future improvements to the regulatory framework and in passing lessons on to project development.

Appendix E - test exercise feedback form

Sufficient time should be allowed to provide and collect feedback during the workshop. A short post-event questionnaire sent out to participants a few days after the event may also shed light on lessons learned. Below is an example of a possible sheet to include in the workshop:

<table>
<tr><td>REGULATORY COMPONENT
CAPTURE ☐
TRANSPORT ☐
STORAGE ☐</td><td>REGULATORY NAME:</td><td rowspan="2">ISSUES WHERE ADDITIONAL INFORMATION WAS REQUIRED TO MAKE AN ASSESSMENT:</td><td rowspan="2">PROBLEMS ENCOUNTERED IN THIS REGULATORY COMPONENT:</td><td rowspan="2">SOLUTIONS SUGGESTED / FOUND TO THESE PROBLEMS:</td></tr>
<tr><td>COMPETENT AUTHORITIES INVOLVED:
Government ☐
Health and Safety Regulator ☐
Crown lands Environment Agency ☐
Maritime Regulator ☐
Energy Ministry ☐
Local Planning Body ☐

LEAD COMPETENT AUTHORITY:</td><td>TIMELINE AGREED FOR COMPLETION OF REGULATORY COMPONENT:
_____ WEEKS
_____ MONTHS
_____ YEARS</td></tr>
<tr><td>STATUTORY CONSULTEES INVOLVED:
Conservation Authority ☐
Environment Agency ☐
Local Planning Body ☐</td><td>HOW TO STREAMLINE PROCESS & TIMELINE</td><td>AREAS OF PRESSURE (GAPS, UNCERTAINTIES, OVERLAPS, DUPLICATION WITH OTHER REGIMES?)</td><td colspan="2" rowspan="2">OBSERVATIONS ON THE PROCESS:
WHAT WORKED WELL & HOW?

WHAT COULD BE IMPROVED?</td></tr>
<tr><td>PUBLIC GROUPS INVOLVED:
NGOs ☐
Local Community ☐</td><td></td><td></td></tr>
</table>

Appendix F - Scottish experience of a CCS regulatory test exercise

The following case study highlights how a CCS regulatory test exercise was conducted by the Scottish Government during 2010. These were circumstances where data collection was limited by human resource constraints, and unforeseen obstacles caused delays.

The Scottish Government's CCS regulatory test exercise was organised by a few key individuals from across government departments and seconding a member of staff from the Scottish Environment Protection Agency, to provide regulatory guidance between April and August of 2010, although early thinking and data collection had started several months before. The principal objective of the project was to identify any regulatory gaps or overlaps that could be better managed, and to evaluate the risks, barriers, information gaps and any other issues that would affect the successful handling of CCS applications. Such projects would then be subject to Ministerial determination and if approved, could lead to commercial scale projects being realised in Scotland within funding deadlines set by the EU and UK.

In the first stage of the project a comprehensive table of all regulations related to CCS project development was compiled. A wide set of stakeholders in the Scottish and UK governments, as well as private developers with key technical knowledge, were consulted to ensure that the full set of considerations was included.

In the late spring (April-May 2010) it was decided that this data would be fed into a simulated CCS project application to serve as the cornerstone of a 2-day workshop event on August 11 and 12. The aim of this workshop was to test whether the existing regulatory framework was fit for purpose by consulting a wide set of stakeholders in government, industry, academia, competent authorities and NGOs.

When it was decided that a workshop event would be useful, a very brief outline of the proposal was produced and Ministerial approval sought at an early stage, to ensure the concept was driven from the top down. Thereafter invitations were issued in the Minister's name to add weight and support to the event itself and ensure maximum attendance.

Between September and October 2010 an assessment report of this workshop was written. This report is available to the public and can be accessed online at the following address: **www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/traditional-fuels/new-technologies/SGactionCCS/CCSRegulatoryExercise.**

Key conclusions from the Scottish CCS test exercise include the following:

- environment agencies could permit a good application within the existing regulatory framework which is generally fit-for-purpose;
- an effective test exercise can create and build trust between participants and improve shared understanding of the regulatory regime for CCS projects as a whole;
- co-operation across Government departments and regulators will be essential to ensure effective management of CCS regulation within the demanding timescales required by the UK and EU CCS competitions for funding demonstration projects;
- much of the learning around CCS will come through engagement with demonstration project applications and implementation; and
- effective management of the regulatory framework will be crucial for successful CCS demonstration projects and a proactive approach should be taken (e.g. setting up a project monitoring board for projects preparing applications).

Scottish Carbon Capture and Storage (SCCS)

Bob Pegler
General Manager - Europe
Global CCS Institute
Phone: +33 1 5603 6794
Email: bob.pegler@globalccsinstitute.com
www.globalccsinstitute.com

Colin Imrie
Scottish Government
Directorate of Energy and Climate Change
Phone: +44 (0)300 244 1086
Email: colin.imrie@scotland.gsi.gov.uk
www.scotland.gov.uk/energy